[7590-01-P]

NUCLEAR REGULATORY COMMISSION

[Docket Nos. 50-424 and 50-425; NRC-2021-0088]

Southern Nuclear Operating Company, Inc

Vogtle Electric Generating Plant, Units 1 and 2

AGENCY: Nuclear Regulatory Commission.

ACTION: Environmental assessment and finding of no significant impact; issuance.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is considering issuance of exemptions that would permit the Southern Nuclear Operating Company, Inc. (SNC, the licensee) to make changes to the Vogtle Electric Generating Plant (Vogtle), Unit 1 and 2, licensing basis. Specifically, the licensee is seeking exemptions that would allow the use of both a risk-informed approach to address safety issues discussed in Generic Safety Issue (GSI)-191 and to close Generic Letter (GL) 2004-02. The NRC staff is issuing a final Environmental Assessment (EA) and final Finding of No Significant Impact (FONSI) associated with the proposed exemptions.

DATES: The EA and FONSI referenced in this document are available on **[INSERT DATE OF PUBLICATION IN *FEDERAL REGISTER*]**.

ADDRESSES: Please refer to Docket ID **NRC-2021-0088** when contacting the NRC about the availability of information regarding this document. You may obtain publicly available information related to this document using any of the following methods:

- **Federal Rulemaking Web Site:** Go to https://www.regulations.gov and search for Docket ID **NRC-2021-0088**. Address questions about Docket IDs in Regulations.gov to Stacy Schumann; telephone: 301-415-0624; e-mail: Stacy.Schumann@nrc.gov. For technical questions, contact the individual listed in the **FOR FURTHER INFORMATION CONTACT** section of this document.

- **NRC's Agencywide Documents Access and Management System (ADAMS):** You may obtain publicly available documents online in the ADAMS Public

Documents collection at https://www.nrc.gov/reading-rm/adams.html. To begin the search, select "Begin Web-based ADAMS Search." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov. For the convenience of the reader, instructions about obtaining materials referenced in this document are provided in the "Availability of Documents" section.

- **Attention:** The PDR, where you may examine and order copies of public documents, is currently closed. You may submit your request to the PDR via e-mail at pdr.resource@nrc.gov or call 1-800-379-4209 or 301-415-4737, between 8:00 a.m. and 4:00 p.m. (EST), Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: John G. Lamb, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone: 301-415-3100, e-mail: John.Lamb@nrc.gov.

SUPPLEMENTARY INFORMATION:

I. Introduction

The NRC is considering issuance of exemptions and license amendments of Renewed Facility Operating Licenses NPF-68 and NPF-81, issued to Southern Nuclear Operating Company (SNC, the licensee), for operation of the Vogtle Electric Generating Plant (Vogtle), Units 1 and 2, located in Burke County, Georgia. The license amendments and regulatory exemptions would allow SNC to incorporate the use of a risk-informed approach to address safety issues discussed in GSI-191 and to close GL 2004-02. Therefore, as required by section 51.21 of title 10 of the *Code of Federal Regulations* (10 CFR), "Criteria for and identification of licensing and regulatory actions requiring environmental assessments," the NRC performed an EA. Based on the results of the EA that follows, and in accordance with 10 CFR 51.31(a), the NRC has determined not to prepare an environmental impact statement for the proposed licensing action and is issuing a FONSI.

The NRC established GSI-191 to determine whether the transport and accumulation of debris from a loss-of-coolant accident (LOCA) in the pressurized-water reactor (PWR) containment structure would impede the operation of the emergency core cooling system (ECCS) or containment spray system (CSS). A LOCA within the containment structure is assumed to be caused by a break in the primary coolant loop piping. Water discharged from the pipe break and debris would collect on the containment structure floor and within the containment emergency sump. During this type of accident, the ECCS and CSS would initially draw cooling water from the refueling water storage tank (RWST). However, realigning the ECCS pumps to the containment emergency sump would provide long-term cooling of the reactor core. Therefore, successful long-term cooling depends on the ability of the containment emergency sump to provide adequate flow to the residual heat removal (RHR) recirculation pumps for extended periods of time.

One of the concerns addressed by the implementation of GSI-191 is that material, such as insulation installed on piping and components, within the containment structure could be dislodged by jets of high-pressure water and steam during the LOCA. Water, along with debris, would accumulate at the bottom of the containment structure and flow towards the emergency sumps. Insulation and other fibrous material could block the emergency sump screens and suction strainers, which in turn could prevent the containment emergency sump from providing adequate water flow to the residual heat removal pumps (for more information, see NUREG-0897, “Containment Emergency Sump Performance,” Revision 1).

By letter dated September 30, 2019, the NRC issued the “Final Staff Evaluation for Vogtle Electric Generating Plant, Units 1 and 2, Systematic Risk-Informed Assessment of Debris Technical Report (EPID L-2017-TOP-0038).” SNC proposes to use the “Final Staff Evaluation for Vogtle Electric Generating Plant, Units 1 and 2, Systematic Risk-Informed Assessment of Debris Technical Report” to demonstrate compliance with 10 CFR 50.46 through both plant-specific testing and a risk-informed

approach (described in more detail in the following paragraphs). Since the use of a risk-informed approach is not recognized in the regulations, SNC requested an exemption to 10 CFR 50.46(a)(1) for certain conditions associated with the treatment of debris. If approved, the proposed action would result in physical modifications to reduce the overall height of the RHR sump strainers at Vogtle, Units 1 and 2, by removing the two top disks from each stack of the RHR strainer assemblies. In addition, emergency operating procedures would be revised to inject additional RWST inventory for piping breaks that do not initiate containment sprays. These physical and procedural modifications will ensure that the RHR strainers are completely submerged for an increased number of postulated LOCA scenarios, which reduces the risk associated with post-accident debris effects.

II. Environmental Assessment

Description of the Proposed Action

The proposed action would allow SNC to incorporate the use of a risk-informed approach to address safety issues discussed in GSI-191 and to close GL 2004-02. The proposed action is in response to the licensee's application dated August 17, 2020, as supplemented by letters dated December 17, 2020, and February 15, 2021.

Need for the Proposed Action

The proposed action is needed because, as the holder of Renewed Facility Operating License Nos. NPF-68 and NPF-81, SNC is expected to address the safety issues discussed in GSI-191 and to close GL 2004-02 with respect to Vogtle, Units 1 and 2. Consistent with SECY-12-0093, SNC chose an approach which requires, in part, that SNC request that the NRC amend the renewed facility operating licenses and grant certain regulatory exemption for each unit.

Environmental Impacts of the Proposed Action

The NRC staff has completed its evaluation of the environmental impacts of the proposed action.

Vogtle, Units 1 and 2, are located on an approximately 3,169-acre site on a Coastal Plain bluff on the southwest side of the Savannah River in Burke County, Georgia, approximately 15 miles east-northeast of Waynesboro, Georgia, and 26 miles southeast of Augusta, Georgia.

Vogtle consists of two four-loop Westinghouse PWR units. The reactor core of each unit heats water, which is pumped to four steam generators, where the heated water is converted to steam. The steam is then used to turn turbines, which are connected to electrical generators that produce electricity. A simplified drawing of a PWR can be viewed at https://www.nrc.gov/reactors/pwrs.html.

The reactor, steam generators, and other components are housed in a concrete and steel containment structure (building). The containment structure is a reinforced concrete cylinder with a concrete slab base and hemispherical dome. A welded steel liner is attached to the inside face of the concrete shell to ensure a high degree of leak tightness. In addition, the 4-foot (1.2-meter)–thick concrete walls of the containment structure serve as a radiation shield. Additional information on the plant structures and systems, as well as the environmental impact statement for license renewal, can be found in NUREG-1437, Supplement 34, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Supplement 34 Regarding Vogtle Electric Generating Plant, Units 1 and 2."

Radiological and non-radiological impacts on the environment that may result from issuing the license amendments and granting the regulatory exemptions are summarized in the following sections.

Non-Radiological Impacts

The proposed action would reduce the overall height of the RHR sump strainers by removing the two top disks from each stack of the RHR strainer assemblies. No other changes would be made to structures or land use within the Vogtle, Units 1 and 2, site, and non-radiological liquid effluents or gaseous emissions would not change. In

addition, the license amendments and regulatory exemptions would not result in any changes to the use of resources or create any new environmental impacts.

Therefore, there would be no non-radiological impacts to environmental resources or any irreversible and irretrievable commitments.

Since issuing the license amendment and granting the regulatory exemption would not result in environmental effects, there would be no non-radiological cumulative impact.

Radiological Impacts

Radioactive Gaseous and Liquid Effluents and Solid Waste

Vogtle, Units 1 and 2, use waste treatment systems to collect, process, recycle, and dispose of gaseous, liquid, and solid wastes that contain radioactive material in a safe and controlled manner within NRC and Environmental Protection Agency radiation safety standards.

The license amendments and regulatory exemptions would not require any physical change to the nuclear plant or reactor operations that would affect the types and quantities of radioactive material generated during plant operations; therefore, there would be no changes to the plant radioactive waste treatment systems. A detailed description of the Vogtle radioactive waste handling and disposal activities is presented in Chapter 2.1.4 of Supplement 34 to NUREG-1437.

Radioactive Gaseous Effluents

The objectives of the Vogtle gaseous waste management system (GWMS) are to process and control the release of radioactive gaseous effluents into the environment to be within the requirements of 10 CFR 20.1301, “Dose limits for individual members of the public,” and to be consistent with the as low as is reasonably achievable (ALARA) dose objectives set forth in appendix I to 10 CFR part 50. The GWMS is designed so that radiation exposure to plant workers is within the dose limits in 10 CFR 20.1201, “Occupational dose limits for adults.”

The license amendments and regulatory exemptions would not require any physical change to the nuclear plant or reactor operations that would affect the release of radioactive gaseous effluents into the environment; therefore, there would be no changes to the GWMS. The existing equipment and plant procedures that control radioactive releases to the environment would continue to be used to maintain radioactive gaseous releases within the dose limits in 10 CFR 20.1301 and the ALARA dose objectives in appendix I to 10 CFR part 50.

Radioactive Liquid Effluents

The function of the Vogtle liquid waste processing system (LWPS) is to collect and process radioactive liquid wastes to reduce radioactivity and chemical concentrations to levels acceptable for discharge to the environment or to recycle the liquids for use in plant systems. The principal objectives of the LWPS are to collect liquid wastes that may contain radioactive material and to maintain sufficient processing capability so that liquid waste may be discharged to the environment below the regulatory limits in 10 CFR 20.1301 and consistent with the ALARA dose objectives in appendix I to 10 CFR part 50. The waste is routed through a monitor that measures the radioactivity and can automatically terminate the release in the event radioactivity exceeds predetermined levels. The liquid waste is discharged into the main cooling reservoir. The entire main cooling reservoir is within the Vogtle site boundary and the public is prohibited from access to the area.

The license amendments and regulatory exemptions would not require any physical change to the nuclear plant or reactor operations that would affect the release of radioactive liquid effluents into the environment; therefore, there would be no changes to the LWPS. The existing equipment and plant procedures that control radioactive releases to the environment would continue to be used to maintain radioactive liquid releases within the dose limits in 10 CFR 20.1301 and the ALARA dose objectives in appendix I to 10 CFR part 50.

Radioactive Solid Wastes

The function of the Vogtle solid waste processing system (SWPS) is to process, package, and store the solid radioactive wastes generated by nuclear plant operations until they are shipped off site to a vendor for further processing or for permanent disposal at a licensed burial facility, or both. The storage areas have restricted access and shielding to reduce radiation rates to plant workers. The principal objectives of the SWPS are to package and transport the waste in compliance with NRC regulations in 10 CFR part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," and 10 CFR part 71, "Packaging and Transportation of Radioactive Material," and the U.S. Department of Transportation regulations in 49 CFR parts 170 through 179; and to maintain the dose limits in 10 CFR 20.1201, 10 CFR 20.1301, and appendix I to 10 CFR part 50.

The existing equipment and plant procedures that control radioactive solid waste handling would continue to be used to maintain exposures within the dose limits in 10 CFR 20.1201, 10 CFR 20.1301, and 10 CFR part 50 appendix I. Thus, there will be no changes to the SWPS and issuing the license amendment and granting the regulatory exemption will not result in any physical changes to the nuclear plant or reactor operations that would affect the release of radioactive solid wastes into the environment.

Occupational Radiation Doses

The license amendments and regulatory exemptions would not require any physical change to the nuclear plant (except for reducing the overall height of the RHR sump strainers) or changes to reactor operations; therefore, there would be no change to any in-plant radiation sources. In addition, no new operator actions would be implemented that could affect occupational radiation exposure. The licensee's radiation protection program monitors radiation levels throughout the nuclear plant to establish appropriate work controls, training, temporary shielding, and protective equipment requirements so that worker doses remain within the dose limits in 10 CFR part 20,

subpart C, “Occupational Dose Limits.” The license amendments and regulatory exemptions would not change radiation levels within the nuclear plant and, therefore, there would be no increased radiological impact to the workers.

Offsite Radiation Dose

The primary sources of offsite doses to members of the public from the Vogtle are radioactive gaseous and liquid effluents. As discussed previously, there would be no change to the operation of Vogtle radioactive gaseous and liquid waste management systems or their ability to perform their intended functions. Also, there would be no change to the Vogtle radiation monitoring system and procedures used to control the release of radioactive effluents in accordance with radiation protection standards in 10 CFR 20.1301, 40 CFR 190, “Environmental Radiation Protection Standards for Nuclear Power Operations,” and the ALARA dose objectives in appendix I to 10 CFR part 50.

Based on this information, the offsite radiation doses to members of the public would not change and would continue to be within regulatory limits. Therefore, the license amendments and regulatory exemptions would not change offsite dose levels and, consequently, there would be no significant health effects from the proposed action.

Design-Basis Accidents

Design-basis accidents at Vogtle, Units 1 and 2, are evaluated by both the licensee and the NRC to ensure that the units would continue to withstand the spectrum of postulated accidents without undue hazard to the public health and safety and to ensure the protection of the environment.

Separate from the environmental review, the NRC is evaluating the licensee’s technical and safety analyses provided in support of the proposed action. The results of the safety review and conclusion will be documented in a publicly available safety evaluation. The safety evaluation must conclude that the proposed action will (1) provide reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) provide reasonable assurance

that such activities will be conducted in compliance with the Commission's regulations, and (3) not be inimical to the common defense and security or to the health and safety of the public. The NRC would not take the proposed action absent such a safety conclusion.

Radiological Cumulative Impacts

The radiological dose limits for protection of the public and plant workers have been developed by the NRC and the Environmental Protection Agency to address the cumulative impact of acute and long-term exposure to radiation and radioactive material. These dose limits are codified in 10 CFR part 20, “Standards for Protection Against Radiation,” and 40 CFR part 190.

Cumulative radiation doses are required to be within the limits set forth in the regulations cited in the previous paragraph. The license amendments and exemptions would not require physical changes to the plant (except for reducing the overall height of the RHR sump strainers) or changes to plant activities; in-plant radiation sources would not change and offsite radiation dose to members of the public would not change. Therefore, there would be no significant cumulative radiological impact from the proposed action.

Radiological Impacts Summary

Based on these evaluations, the license amendments and exemptions would not result in any significant radiological impacts. Therefore, the safety evaluation must conclude that the proposed action will (1) provide reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) provide reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) not be inimical to the common defense and security or to the health and safety of the public. The NRC would not take the proposed action absent such a safety conclusion.

Environmental Impacts of the Alternatives to the Proposed Action

As discussed earlier, licensees have options for responding to GL 2004-02 and for demonstrating compliance with 10 CFR 50.46. Consistent with these options, as an alternative to the proposed action, the licensee could choose to remove and replace insulation within the reactor containment building. This would require the physical removal and disposal of significant amounts of insulation from a radiation area within the reactor containment building and the installation of new insulation less likely to impact sump performance.

Removal of the existing insulation from the containment building would generate radiologically contaminated waste. SNC estimated that between 4,000 and 5,000 cubic feet of fiberglass insulation per unit would have to be removed from Vogtle, Units 1 and 2, containment. This estimate is based on calculations performed for South Texas Project (STP) and the similarities between Vogtle and STP. The removed insulation would require special handling and packaging so that it could be safely transported from the site. The licensee would likely use existing facilities to process and store this material until it could be transported to a low-level radioactive or hazardous waste disposal site. Energy (fuel) would be expended to transport the insulation and land would be expended at the disposal site.

The removal of the old insulation and installation of new insulation would expose workers to radiation. In its application, SNC estimated generically that the expected total dose for replacing insulation in Vogtle, Units 1 and 2, is about 200 rem (100 rem per unit), based on the calculations performed for STP. The NRC reviewed NUREG-0713, Volume 40, “Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 2018: Fifty-First Annual Report,” and determined that SNC’s average baseline collective radiation exposure is approximately 62 person-rem. This additional 200 person-rem collective exposure would be shared across the entire work force involved with removing and reinstalling insulation. In SECY-12-0093, the NRC attempted to develop a total occupational dose estimate for the work involved in

insulation removal and replacement associated with GSI-191. Due to uncertainties in the scope of work required to remove and replace insulation at a specific nuclear plant and other site-specific factors such as source term and hazardous materials, the NRC was unable to estimate the total occupational dose associated with this work. However, dose estimates were provided by the Nuclear Energy Institute (NEI) in a letter to the NRC dated March 30, 2012, based on information collected on occupational radiation exposures that have been, or could be, incurred during insulation removal and replacement. In the letter, NEI noted similar difficulties in estimating the potential amount of radiation exposure, but provided a "per unit" estimate of between 80 and 525 person-rem. Given uncertainties in the scope of work and other nuclear plant-specific factors such as source term and hazardous materials, there is no basis to conclude that the NEI estimates were unreasonable. Therefore, since SNC's estimate of radiation exposure for insulation removal and replacement is within the NEI estimated range, SNC's estimate of an increase of 200 person-rem over baseline exposure is reasonable.

As stated in the "Occupational Radiation Doses" section of this document, SNC's radiation protection program monitors radiation levels throughout the nuclear plant to establish appropriate work controls, training, temporary shielding, and protective equipment requirements so that worker doses are expected to remain within the dose limits in 10 CFR 20.1201.

In addition, as stated in the "Offsite Radiation Dose" section of this document, SNC also has a radiation monitoring system and procedures in place to control the release of radioactive effluents in accordance with radiation protection standards in 10 CFR 20.1301, 40 CFR part 190, and the ALARA dose objectives in appendix I to 10 CFR part 50. Therefore, radiation exposure to members of the public would be maintained within the NRC dose criteria in 10 CFR 20.1301, 40 CFR part 190, and the ALARA dose objectives of appendix I to 10 CFR part 50.

Based on this information, impacts to members of the public from removing and replacing insulation within the reactor containment building would not be significant.

However, impacts to plant workers and the environment from implementing this alternative would be greater than implementing the proposed action.

Alternative Use of Resources

The proposed action would not involve the use of any different resources (e.g., water, air, land, nuclear fuel) not previously considered in NUREG-1437, Supplement 34.

Agencies and Persons Consulted

In accordance with its stated policy, on March 11, 2021, the NRC staff consulted with the State of Georgia officials, Ms. Shelby Naar, Mr. Sean Hayes, Mr. David Matos, and Mr. Richard Dunn, regarding the environmental impact of the proposed action. The State of Georgia officials had no comments on the EA and FONSI.

III. Finding of No Significant Impact

The licensee requested to amend Facility Operating License Nos. NPF-68 and NPF-81 to grant exemptions for Vogtle, Units 1 and 2, from certain requirements of 10 CFR 50.46(a)(1). This proposed action would not significantly affect plant safety, would not have a significant adverse effect on the probability of an accident occurring, and would not have any significant radiological or non-radiological impacts. It would also not result in any changes to radioactive effluents or emissions, exposures to nuclear plant workers and members of the public, or any changes to radiological and non-radiological impacts to the environment.

Consistent with 10 CFR 51.21, the NRC conducted an environmental review of the proposed action, and this FONSI incorporates Section II of the EA by reference in this notice. Therefore, the NRC concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the NRC has determined there is no need to prepare an environmental impact statement for the proposed action.

As required by 10 CFR 51.32(a)(5), the related environmental document is the "Generic Environmental Impact Statement for License Renewal of Nuclear Plants:

Regarding Vogtle Electric Generating Plant, Units 1 and 2, Final Report," NUREG-1437, Supplement 34, dated November 2008, which provides the latest environmental review of current operations and description of environmental conditions at Vogtle.

This FONSI and other related environmental documents are accessible online in the ADAMS Public Documents collection at https://www.nrc.gov/reading-rm/adams.html. Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS should contact the NRC's PDR reference staff by telephone at 1-800-397-4209 or 301-415-4737, or by e-mail to pdr.resource@nrc.gov.

IV. Availability of Documents

The documents identified in the following table are available to interested persons through one or more of the following methods, as indicated.

DOCUMENT	ADAMS ACCESSION NO.
NUREG-0897, Containment Emergency Sump Performance: Technical Findings Related to Unresolved Safety Issue A-43, Revision 1, October 1985.	ML112440046
NRC Generic Letter 2004-02, Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors, September 13, 2004.	ML042360586
NEI letter to NRC, Nuclear Energy Institute, GSI-191 Dose Estimates, March 30, 2012.	ML12095A319
Commission SECY-12-0093, Closure Options for Generic Safety Issue - 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance, July 9, 2012.	ML121320270 (package)
Commission SRM-SECY-12-0093, Staff Requirements – SECY-12-0093 – Closure Options for Generic Safety Issue – 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance, December 14, 2012.	ML12349A378
NUREG-1437, Supplement 34, Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Supplement 34 Regarding Vogtle Electric Generating Plant, Units 1 and 2: Final Report, December 2008.	ML083380325
STPNOC Letter, "Revised STP Pilot Submittal and Requests for Exemptions and License Amendment for a Risk-Informed Approach to Resolving Generic Safety Issue (GSI)-191, June 19, 2013	ML13175A211
NUREG-0713, Volume 40, Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 2012: Fifty-First Annual Report, March 2018	ML20087J424

NRC Letter, “Final Staff Evaluation for Vogtle Electric Generating Plant, Units 1 and 2, Systematic Risk-Informed Assessment of Debris Technical Report,” September 30, 2019	ML19120A469
SNC Letter, “Exemption Request and License Amendment Request for a Risk-Informed Resolution to GSI-191,” August 17, 2020	ML20230A346
SNC Letter, “Response to Request for Additional Information Regarding Risk-Informed Resolution to GSI-191,” December 17, 2020	ML20352A228
SNC Letter, “Vogtle Electric Generating Plant – Units 1 and 2, Supplement to Request for Exemption to Support Risk-Informed Resolution to Generic Letter 2004-02,” February 15, 2021	ML21046A094

Dated: April 2, 2021.

For the Nuclear Regulatory Commission.

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Office of Nuclear Reactor Regulation.

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